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theatre of so many interesting events, this is but a slight and superficial performance. There are many old and rare books, which contain interesting notices of this country; and a memoir on its natural and civil history, such as might be drawn up from these ample materials, would form a very interesting work. Many of these works, it is true, are not often met with, and for this reason such a work as we have mentioned would be the more valuable. Nearly all the works of value relating to Florida, as well as to every other part of America, are to be found in the library of the Boston Athenæum, as well as in the Ebeling library at Cambridge. We had intended to annex a list of the choicest books relating to this subject, to be met with in these collections; but it is time to bring this article to a close.

ART. V.—*American Medical Botany; being a collection of the native Medicinal Plants of the United States, containing their botanical history and chemical analysis, and properties and uses in medicine, diet, and the arts, with coloured engravings. By Jacob Bigelow, M. D. Rumford Professor and Lecturer on Meteria Medica and Botany in Harvard University.* Boston, Cummings & Hilliard, 1817—1821. 6 nos. or 3 vols. imp. 8vo.

A large portion of this work has been before the public long enough to have been duly appreciated; and several notices of it, more or less extended, have already appeared in the literary and scientific journals of the day. We have not, therefore, made it the subject of this article, in the expectation of giving any wider diffusion to the high reputation of the author, than that which the well known character of his writings has already gained him: but we mean to consider it, in a botanical point of view only, for the single purpose of ascertaining what additions it has made to the science of natural history. The task of investigating our botany has, in times past, been too much abandoned to the zeal and curiosity of foreigners, and, with a few honorable exceptions, while we ourselves were devoted to the more profitable employments of commerce and agriculture, a Catesby, a Kalm, a Michaux, or a Pursh was reaping a harvest of fame on our own soil, and teaching us to admire the grandeur of our own majestic forests and luxuriant savannahs. But now that botanical science is flourishing among us under the legitimate auspices of Americans, we can look back upon its progress without feeling mortified by the retrospect, when we find it cultivated not only by Clayton, Bartram and Colden, but more recently by Muhlenberg, Barton, Bigelow, Elliott and Nuttall.

On examining the printed sources, from which a knowledge of our botany may be derived, we shall perceive them to be of three kinds : either botanical works exclusively devoted to some section of the country, like the Floras of Gronovius and Pursh; or collections entering into more entensive publications, such as the Species Plantarum; or detached notices scattered through periodical journals, elementary treatises, histories and itineraries. And, although several authors have professed to give us a collection of the plants of this whole continent, we believe that hardly a single vegetable of North America has been described, always excepting the plants of Mexico and Greenland, which cannot be indicated growing spontaneously within the present enlarged limits of the United States. The few plants which naturalists have collected in Canada, and even those in the Banksian Herbarium, as described by Pursh, which were brought from the North-west Coast, from Labrador, and from Hudson's Bay, we think may all be found in this country. And for this reason we protest against the comprehensive title, which several modern writers, Michaux, Pursh and Nuttall, have seen fit to assume for their works : considering the botanical collections, which have appeared under the name of North American plants, to be rightly appropriated to the states and territories of our republic, stretching, as they now do, from the lakes to the gulf of Mexico in one direction, and in the other from the Atlantic to the Pacific ocean, and embracing in these boundaries every conceivable variety of situation, climate and soil. Having premised these considerations, we propose, in the first place, to take a brief review of the principal botanical works that have been published relating to the United States, and next to inquire how far these works will go towards affording us the materials for a perfect history of our plants.

Although every navigator, from the time that Europeans first became acquainted with this country, was struck with the richness and profusion of our vegetable productions, and although several plants, such as the sassafras, ginseng, tobacco and others, soon became important objects of commercial enterprise, we find little scientific attention to have been paid to our botany at a very early period. How interesting our scenery appeared to Europeans may be judged from the account of Gosnold, the first who explored New England, the least favored, perhaps, in its vegetable aspect, of any part of the United States. This navigator represents himself to have been utterly astonished at the rich appearance of the country, which seemed to him like one extensive park planted by the hand of nature, where he saw deer wandering at large in stately forests, and innumerable plants blooming around him spontaneously, which were highly prized and cultured with solicitude in England. But the vague and cursory notices of our vegetables given by early travellers are not of much use to the botanist at this time, excepting that they sometimes enable him to establish, what might otherwise be doubtful, the birth-place of plants, which are now common to both the old and new worlds. In this way, for instance, we know that some of our most common plants, such as the Chrysanthemum leucanthemum, were introduced from abroad; and that others, like the Pyrola umbellata, which we hear of as a medicine among the aboriginal inhabitants of the country, or the Drosera rotundifolia, mentioned by Josselyn, are indigenous to America as well as Europe.

The earliest systematic work on the botany of this portion of America is by Cornuti, (often incorrectly called *Cornutus*), entitled a History of the Plants of Canada, a small quarto volume in Latin, printed at Paris in 1635, containing descriptions and coarse engravings of sixty or seventy of the most remarkable plants found in New France. Cornuti briefly enumerates the medical uses and botanical characteristics of these few plants, and, as none of them had ever before been described, the book once attracted so much notice as to be spoken of with respect by Haller in his Bibliotheca Botanica.

Beside what is contained in Cornuti, some information with regard to our botany may be gleaned from several other collections published in the same century, particularly Gerard's Herbal, Ray's History of Plants, Plukenet's Almagestum, Amaltheum and Phytographia. One or two of the provincial histories also contain such botanical intelligence, as their authors could gather without any well directed views of science. The most complete work of this kind is Brickell's Natural History of North Carolina, printed in 1737, which is occasionally quoted by the younger Michaux. Charlevoix's History of New France, published in 1745, may be mentioned, too, as affording a few curious details, with not inaccurate engravings, of nearly a hundred plants of Canada and Louisiana. But these books, like Josselyn's Rarities of New England, are all too superficial, in the nature of their information, to admit of much application to the ends of modern botany.

Previously, then, to the revolution effected in natural science by Linnæus and the subsequent zeal displayed by philosophers in exploring different countries for the purpose of making scientific discoveries, the only valuable work on the botany of this country is Catesby's Natural History of Carolina, Florida, and the Bahama islands. And it is observable that, as the meridional parts of America, in consequence of the mildness of their climate and the superior richness of their productions of every kind, were the first to be settled by Europeans, so the natural history of those tracts of the new world was quite familiar to philosophers much earlier than that of the more northerly sections of the continent. Hence we find the bulky folios of Piso on the natural history of Brazil, of Plumier and Sloane on the Islands, and of Hernandez on Mexico, to have appeared, when extremely little was known of the same subjects in the rest of America. Hence also the first important work, which departs from the limits of tropical America, namely, Catesby's History, does but just step out of those limits into the nearest regions of the now United States. Its author, Mark Catesby, an English naturalist of some credit, had spent seven years in Virginia, from 1712 to 1719, chiefly employed in the study of its natural history; and at the expiration of that period returning to England, he was prevailed upon, at the suggestion of his patron, Dr Sherard, and with the assistance of the earl of Macclesfield, sir Hans Sloane, and other philosophers of the time, to undertake another voyage to America, with the express design of collecting, describing, and delineating its most remarkable natural productions. The fruit of his voyage was the Natural History of Carolina. It first appeared in numbers between 1730 and 1748, with splendid colored plates etched by himself from his own drawings and painted under his immediate inspection; a second edition was published in 1754, and a third in 1771, of which both, and especially the last, are much inferior to the original impression. The work contains brief descriptions, in

French and English, of the birds, beasts, fishes, insects, and plants indigenous to the regions comprehended in its plan; and, beside its being more complete than any thing which had gone before it, the elegance of its figures gave it high celebrity at the time of its publication, and still retains for it no little reputation. But two unpardonable faults, both attributable to the age in which it was compiled, detract from the botanical value of Catesby's Natural History. The first defect, to which we allude, is the total absence of a convenient classification; and the second, which is a consequence of the first, is the neglect, both in the drawings and descriptions, to notice the minuter parts of the fructification and inflorescence, which the discoveries of Linnæus have elevated into such indispensable importance in every work on systematic botany. Catesby's Herbarium is now deposited in the British Museum.

The next book relating to our plants is of less pretension than Catesby's History, but of far more value as a scientific work, namely, the Flora Virginica, the joint production of Clayton and Gronovius, assisted by Linnæus himself, who was in Holland at the time it was written. John Clayton emigrated from England to America in the year 1705, and resided here till his death in 1771, filling, for upwards of half a century, the office of clerk of Gloucester county in Virginia. During a long life of eighty-eight years he assiduously cultivated the science of botany, in which he attained high rank through his communications with the learned men of Europe. In addition to these extensive communications which he made, he was engaged in preparing for publication a large botanical work, which at his death he left behind him ready for the press, but which is now unhappily lost, having been consumed, together with the building in which it was deposited, in the early part of the revolutionary war. Among the correspondents of Clayton was John Frederic Gronovius, a distinguished naturalist of Leyden, to whom Clayton was in the habit of sending dried specimens of plants with copious and accurate descriptions. Of these materials Gronovius composed the Flora Virginica, first printed at Leyden in 1739, with a supplement in 1743, and afterwards consolidated into a single volume in 1762 under the superintendance of Laurence, the son of John Gronovius. Clayton's Herbarium, at the decease of the younger Gronovius, was purchased by sir Joseph Banks, in whose possession it was used by Pursh in the compilation of his Flora. The appearance of the Flora Virginica is to be looked upon as an era in the history of our botany, since it is the oldest accurate systematic work on the subject. The classification of Linnæus, although it had yet made little progress in Europe, was now rapidly rising into notoriety in the north; and the adoption of it in the Flora Virginica, with all its advantages of precision, perspicuity, definiteness and elegance, imparted to this work a value, which it cannot lose until the sexual system ceases to be studied. In 1812 the elder Barton designed and commenced a new edition of the Flora Virginica, which, however, his numerous occupations never permitted him to accomplish.

Here, rather than in any other place, should be noticed the labors of Linnæus in illustrating the botany of this country; but he is so completely an element and an essential portion of the whole science of botany itself, that, although he was in no small degree attentive to our plants, we shall content ourselves with indicating the sources from which he derived his information concerning the botany of the United States. Next to Clayton, whose Flora Virginica was the basis of Linnæus' account of our plants, his most useful correspondent was the celebrated John Bartram, esteemed by Linnæus the best practical botanist of the age in which he lived. Bartram was a native of Pennsylvania, where he resided until his death in 1777, in his seventy-sixth year, attaining, like his contemporary Clayton, a vigorous old age in the diligent cultivation of natural science, the fruits of which he was in the practice of communicating to the learned in Europe, above all to Linnæus.* Another valued friend of Linnæus was the respectable historian of the Five Nations, Cadwallader Colden, who sent his correspondent an enumeration of several hundred American plants in a paper published among the Acta Societatis Upsaliensis. A fourth American correspondent of Linnæus was Dr Adam Kuhn, who went to study under the great reformer of natural science himself at Upsal, and after his return became the first public teacher of botany in our country, being appointed professor of that branch of natural history in what is now the university of Pennsylvania. Finally, by the recommendation of Linnæus, professor Kalm, of Abo, made a voyage to America between the years 1748 and 1751, for the purpose of collecting specimens and studying natural history, of which voyage he afterwards published an account in a respectable book of Travels. He procured Linnæus many plants, all of which, marked with the letter K, belong to the Linnæan Herbarium, now in the hands of sir James Edward Smith. By these means, and the correspondence of other naturalists in America, Linnæus became master of nearly a thousand species of our plants, which enter largely into the composition of the Systema Vegetabilium. And the attention excited by the writings of Linnæus, together with the comparative fulness of those writings in botanical collections, may have been the cause of the chasm, that occurs in the history of our botany for more than twenty years after the second edition of Gronovius and Clayton's Flora Virginica. Perhaps also the revolutionary war, which deprived us of the treasure which Clayton had spent his life in compiling, may have impeded the investigations of foreign botanists in this country, until after the time when our independence was acknowledged.

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* The sons of Bartram inherited his taste for the study of natural history. One of them, William, is well known by his travels in Carolina, Georgia, and the Floridas.

The first fruits of the peace, however, were a native production, namely, an Account of the Vegetables indigenous to this Part of America, published in 1785 in the Memoirs of the American Academy, by the venerable Dr Cutler. Considering the time when this paper was drawn up and the little attention which had then been paid to botany in New England, it was certainly, notwithstanding its want of completeness and accuracy, a meritorious production, from its bringing into notice several valuable plants, whose properties were very imperfectly understood previously to its appearance.*

In 1781 a small German book had been printed at Gœttingen, entitled a Description of some Species of North American Trees and Shrubs; and in 1787 the work was republished in a much improved and enlarged form, with accurate, but coarse engravings, under the name of 'Contribution to German Scientific Forestry, treating the Culture of the North American trees, with application to German forests.' Frederic A. J. von Wangenheim, the author of this rare book, served in America, during the revolutionary war, as captain of a troop in the Hessian cavalry, and was afterwards employed as an upper forester in Prussia. Sprengel says he acquired great credit for his exact knowledge and cultivation of the trees of North America.

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* This remark applies to Cutler's account of the Iris versicolor, Hamamelis Virginica, the genus Rhus, Phytolacca decandra, and more especially Ictodes fœtidus, which, although Catesby had taken it for an Arum, Cutler pronounced to be a new genus, and possessed of great virtue as a remedy for asthmatic complaints. This last vegetable has experienced rather a singular fortune, having been first referred to Arum, then by Linnæus transferred to Dracontium, to Pothos by Michaux, to Symplocarpus by Salisbury, and finally established as the genus Ictodes by Bigelow and Cutler. Dr Cutler is likewise advantageously known by his account of the Lobelia inflata given in evidence at the trial of the notorious Thompson. See Massachusetts Term Reports, vol. vi, p. 134.

A small treatise on our forest trees was also published at Philadelphia in 1785, by Humphrey Marshall, under the title of Arbustum Americanum. Its author was long known as a scientific horticulturist, whose garden is said by Pursh to have contained a valuable collection of trees and shrubs in 1801, but to have declined a few years afterwards on the death of Marshall. The Arbustum Americanum was so much esteemed as to be translated into French, and reprinted at Paris soon after it first appeared; but neither that, nor Wangenheim, nor another German work, on the forest-trees cultivated in a celebrated garden at Harbke in the dutchy of Brunswic, published in 1771, by John Philip Duroi, and sometimes referred to on the subject of our botany, can be supposed to afford much information, which is not contained in the more recent and complete works of the Michaux.

Next after these appeared the Flora Caroliniana. Of its author, Thomas Walter, we have never happened to meet with any notice in print; but in his preface he informs us that all his specimens were collected within an area of two hundred miles in circumference, which, from the date of the preface, would seem to have been on the banks of the river Santee in South Carolina. His work was printed at London in 1788, in Latin, containing the essential characters and specific descriptions of more than a thousand plants, arranged according to the principles of the sexual system. It is valuable as containing a large number of species, and nearly thirty genera, then for the first time described; but as it merely gives the botanical differences, without any allusion to the habit, soil, or other circumstances connected with the plants, it is now superseded by later publications; although few authorities are more frequently quoted or more relied upon than the name of Walter. Pursh says, that he saw Walter's Herbarium in the possession of the family of John Fraser, who introduced so many of our plants into the English gardens and who was the intimate friend of Walter.

Before leaving the botanical works printed in the eighteenth century, we ought to mention some remarks on the most useful vegetables of the United States, forming a very considerable part of the Travels of Luigi Castiglioni, a gentleman of Milan, who passed nearly three years in this country between 1785 and 1787, and published a reputable account of his observations upon his return to Italy.

We come now to speak of the two Michaux, whose botanical skill and industry entitle them to a distinguished place in our consideration. André Michaux, the elder, of whom there is a biographical account written by Deleuze in the Annals of the Museum, was one of those eminent men, whom the munificence of the kings of France enabled to make researches in foreign countries for the illustration of natural history. Having acquired distinction by his travels in Persia and other parts of Western Asia, Michaux was sent to the United States by Lewis XVI, in 1785 not long before the revolution deprived this monarch of his throne and life, for the purpose of collecting seeds, roots, and specimens of plants. After the dissolution of the monarchy, the republic, which in this instance did not adhere to the love of science she always affected to entertain, neglected to continue his appointments to Michaux; but, with the salary he received before and his patrimonial fortune after the death of the king, he enjoyed sufficient means of pursuing botanical inquiries during the time he remained in this country. In 1801, being returned to Paris, he published his History of the Oaks of America, immediately upon which he embraced an opportunity, which offered itself, for making a voyage to Australasia, leaving to his son the charge of editing his Flora Boreali-Americana. The next year he fell a victim to his zeal for knowledge, dying of a fever whilst engaged in philosophical investigations on the coast of Madagascar. The History of the Oaks of America contains an account of twenty species of the genus Quercus, describing their botanical structure, mode of culture and economical uses, with very complete engravings by P. J. Redouté, so well known to botanists by his sumptuous delineations of the Liliaceous Plants and Roses. This History of our Oaks is the more to be depended on, as Michaux cultivated all the species himself, and observed them carefully in every stage of their growth. For want of similar opportunities of local observation, Duroi, in his work on the trees at Harbke, fell into many mistakes, describing as distinct species, what were only varieties of the same plants at different ages of its growth. The Flora Boreali-Americana, written wholly in Latin, came before the world in 1803, under the superintendence of the younger Michaux. The work was not prepared for the press by the father, but contains no plant which he did not examine in its native soil, and, in its present form, is extracted from manuscripts left by him, the specific descriptions only being often abridged and generic characters added from Murray. Interspersed in the Flora are fifty-one plates, on a smaller scale than those of the Oaks of America, but designed, like them, by P. J. Redouté, and engraved with great neatness and beauty. Finally, if there is any thing in this elegant publication to regret, it is only that it was posthumous: for had the author fortunately lived to publish it himself, he would, no doubt, have enriched it, as he did his History of the Oaks, with a copious list of synonymes, and with popular remarks on the habit, period of growth, qualities and appearance of the several plants, all which particulars are but slightly touched upon or entirely omitted in the Flora.

André Michaux the younger is celebrated, in the same department of science, for his History of the Forest Trees of North America, than which we believe no country can boast a more highly useful account of any part of its natural productions. It was first published between the years 1810 and 1813, with superb colored figures designed by P. J. Redouté, H. J. Redouté, Bessa, Riché and other respectable artists. Since then it has been translated into English by Mr A. L. Hillhouse,* from

* Mr Hillhouse has published, in a separate form, a Description of the European Olive Tree, originally written for his translation of Michaux, from which we extract the following passage relative to the cultivation of the olive in America, as deserving particular notice since our acquisition of the two Floridas. After adverting to the capriciousness of our climate as an obstacle to the introduction of delicate foreign plants, he proceeds to say: 'But, with all these disadvantages, tracts uniting the conditions necessary for the growth of the olive may probably be found sufficiently extensive for our wants. The possibility of its flourishing on our shores has been demonstrated by at least one experiment. While the Floridas were held by the English, an adventurer of that nation led a colony of Greeks into the eastern province, and founded the settlement of New Smyrna. The principal treasure which they brought from their native clime was the olive. Bartram, who visited this settlement in 1775, describes it as a flourishing town: its prosperity, however, was of momentary

a French copy corrected and newly arranged by the author, the figures in the translation being printed upon plates the same with the original, but now somewhat worn, and therefore not affording copies equally elegant with those of the first impression. Michaux collected the materials for his work in the course of two voyages to America, concerning the first of which he published a volume, which contains some valuable hints spread out over a considerable surface. It is the plan of his History of our Forest-Trees to unite the advantages of a work strictly botanical and of one relating to the useful arts, but especially to collect all the scattered details, which books or experience could furnish him, with respect to the application of the various kinds of wood to the purposes of life. Botanical descriptions can easily be made or found; but, in order to ascertain their useful properties, it was necessary to consult artisans in almost every branch of practical mechanics, to frequent the dock-yards or work-shops, in which wood was employed, and in short to gather information from every attainable source. From these inquiries Michaux has obtained a most extensive collection of curious and important facts, which, although rather belonging to the application of botany than to botany itself, are nevertheless essential to the complete knowledge of the plants of the United States. For, beside the commercial and practical uses of our trees, we have a very perfect account of the inflorescence, fructification, growth and botanical habit of them individually considered, as also many interesting facts with regard to them taken together as composing forests. With respect to the nomenclature of this work

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duration: driven to despair by hardship and oppression, and precluded from escape by land, where they were intercepted by the wandering savages, a part of these unhappy exiles conceived the hardy enterprise of flying to the Havanna in an open boat; the rest removed to St Augustine when the Spaniards resumed possession of the country. In 1783, a few decaying huts and several large olives were the only remaining traces of their industry.'

'Louisiana, the Floridas, the islands of Georgia and chosen exposures in the interior of the state, will be the scene of this culture. Perhaps it will be extended to some parts of the Western States: it has been hastily concluded that the olive can exist only in the vicinity of the sea; it has been found in the centre of Spain, and in Mesopotamia at the distance of a hundred leagues from the shore. The trial should be made in every place where its failure is not certain, and for this purpose young grafted trees should be obtained from Europe, and the formation of nurseries from the seed immediately begun.' Description of the European Olive Tree, pp. 39, 40. The Greek colony above alluded to is the same spoken of in the preceding article of this number, p. 97. See also Bartram's Travels, p. 142.

it may be observed, that Michaux has been charged with making needless innovations in long established names, sometimes without any intimation of the change. But the great accuracy of its beautiful figures, at the same time that it serves to correct any misunderstanding that might arise from occasional confusion in the specific names, gives this History of our Forest Trees a permanent value in technical botany.

We have now reached the period, when two American botanists flourished, of whom every person, whether native or foreigner, who has had any connexion with our botany, always speaks in the highest terms of gratitude. We refer to Dr Muhlenberg and Dr Barton. Benjamin Smith Barton, born at Lancaster in 1766, after going through the customary medical education at home and abroad, in 1789, was made professor of natural history, a science for which he had always entertained a marked predilection, in the college of Philadelphia. His appointment was confirmed on the institution of the university of Pennsylvania, where his reputation as a naturalist soon procured his election as professor of the materia medica, and where his medical character afterwards led to his being made professor of the practice of physic, in which station he died in 1815, having continued to perform the duties of a medical instructer with great applause until a few months before his death. He published several botanical works in addition to his tracts on medicine, zoology and the antiquities of America. The most important of these works, in the present connexion, are his Collections for an Essay towards a Materia Medica of the United States and his Elements of Botany. The Collections were published in parts at different periods between 1789 and 1810, but, unfinished as he left them, they are not reputed to have made very important additions to our knowledge of the plants of America. Nothing of any value had yet appeared on our vegetable materia medica excepting a short paper on Canadian Specifics, written in 1756, by a Swede named John von Cœlln, and preserved in the Amœnitates Academicæ, and a small work by John David Schœpf, a physician attached to the German troops in America during the war, published at Erlangen, in the present kingdom of Würtemberg, in 1787, and slightly commended in Sprengel's History of Botany. The Collections, therefore, as inviting the public attention to a subject, which had not been adequately regarded among us, and as leading to the publication of many valuable papers on our medical botany, deserve to be mentioned with respect. The Elements of Botany, first published in 1803, and reprinted in 1812 and 1814, contain much ingenious speculation and curious learning intermixed with no little affectation, as, for instance, in the supercilious language with which the author continually alludes to Linnæus. In the light of an elementary treatise the work must yield to many others, to Smith, to Sprengel and to De Candolle. Still it derives a peculiar attraction, in the view of Americans, from the circumstance, that it brings our own plants into notice by frequent reference to them, and by means of its colored figures, which Barton was very solicitous to have faithfully executed. In all the scientific writings of this author, however, a diffuse inelegant style and an immethodical arrangement, into which the hurry of his professional pursuits betrayed him, are too remarkable to pass unnoticed, especially as he published almost nothing but incomplete tracts, whose faultiness their very title of *fragments*, *collections* and the like sufficiently indicates. We apprehend, therefore, his botanical fame is built most surely on the gratitude of those naturalists, who were aided by his liberality in making the researches, which his public duties withheld him from undertaking in person. Among these, Pursh and Nuttall, who will be mentioned hereafter, were peculiarly indebted to Dr Barton, and their writings afford the amplest illustration of his genuine love of science.

Contemporary with Barton, of the same State and engaged in like scientific pursuits, was Dr Henry Muhlenberg, minister of Lancaster, distinguished as president of the Lutheran church of Pennsylvania, but still better known as the first botanist of his time in America. Although he had long been in habits of intimate correspondence with naturalists of eminence in Europe, by whom he was highly respected for the zeal and acuteness manifested in his communications, the first work, that he personally gave the public, was a Catalogue of the Plants of North America, in 1813. This Catalogue, compiled almost entirely from living plants or dried specimens in the Herbarium of the author, briefly exhibited the scientific and vulgar name, the calyx, the corolla and the time of flowering, with the locality, of a much larger number of plants than were previously known to belong to the United States, but was intended only as a kind of Prodromus of a full Description, which he had already written many years before, of the plants of

Lancaster and of the many undescribed species contained in his rich Herbarium. Muhlenberg died in 1815, at the age of sixty-two, whilst occupied in preparing for the press a second edition of his Catalogue. He had also published an Index to the Plants of Lancaster in the American Philosophical Transactions. Since his death, beside a new impression of the Catalogue, there has appeared his full Description of the Grasses and Reeds of North America, published in 1816, in Latin, under the care of his son, assisted by Mr Elliott, Mr Collins, and the late Dr Baldwin. This work contains very complete descriptions of all the native or naturalized gramineous species, with a short note of their locality and time of flowering, but without any popular remarks. As a scientific account of an obscure family, and of one which even Walter confessed he had neglected, it is valuable to the botanist, in which respect other writers have acknowledged their obligations to Muhlenberg. Whether the rest of this author's manuscripts will ever be published, seems now to be doubtful, although his work on the Plants of Lancaster has been repeatedly announced as soon to be printed by his friend Mr Collins. The cause of the delay is distinctly intimated by Muhlenberg's son in his preface to the Grasses. Muhlenberg always freely communicated to his friends in Europe the most remarkable plants, which he detected, with accurate descriptions of them, so that his reputation and his discoveries were more widely extended through the medium of his correspondents, than they could have been, perhaps, by the publication of his works in America. Besides, he was so perfectly disinterested in his ardor for the promotion of botanical science, that his living plants, his collections and even his manuscripts were always at the service of his friends; and, as no person thought of interesting himself in our botany without becoming acquainted with Muhlenberg, to this it is partly owing, that his most valuable plants are already described in the botanical works now in circulation.—Dr Muhlenberg's Herbarium was purchased after his death by a number of gentlemen, and generously presented to the American Philosophical Society.

In noticing Dr Barton we mentioned him as a patron of Pursh, author of the Flora Americæ Septentrionalis. Frederic Pursh is said to have been born and to have passed the early part of his life near Tobolski, the capital of Siberia. He was educated at Dresden, which city he left in 1799, and embarked for Baltimore, with the intention of continuing in this country until he should have examined its vegetable productions to the utmost extent of his abilities. Immediately seeking and obtaining the acquaintance of the most eminent botanists, he was enabled, with their assistance, and by acting as a scientific gardener, to travel through different parts of the United States, and to procure so many plants, that, in 1811, he went to England with one of the most perfect collections which ever crossed the Atlantic. In England he was countenanced by Smith, Banks, Lambert, Roscoe and other naturalists, who gave him access to the various rich collections preserved in that country, including the original Herbaria of Linnæus, Plukenet, Catesby, Sherard, Clayton, Walter, Pallas, Bradbury and Menzies. Of these sources of information he gives a grateful, candid, and well written account in the preface to his Flora. After the publication of this work in 1814, he returned to America for the purpose of exploring the botany of Canada, where, as we are told in Silliman's Tour between Hartford and Quebec, he died in the year 1820, not having yet completed his collections towards a Canadian Flora. His Flora Americæ Septentrionalis contains essential characters of the genera and species, either extracted from, or composed after the manner of Willdenow's Species Plantarum. At the end of the specific descriptions is a reference to synonymes and figures in different books, a list of which, with very pardonable vanity, is prefixed to the work. He likewise subjoins to each plant a few popular observations in English, relating its locality, soil, habit, time of flowering and other circumstances of the same nature; but in these observations he has been charged with often speaking at random and without due examination. Of the twenty-four elegant plates contained in the work we do not think all are judiciously chosen, because some plants are figured which are not peculiarly rare, and others omitted more curious in their nature, as well as more uncommon. One very fruitful source of error in Pursh, which grows out of his desire to make his collection more complete, arose from his describing many imperfect plants, or dried specimens only, collected by himself or preceding botanists. Of many of our plants, like the Epilobium alpinum or Arenaria peploides, although very accessible in certain districts east of the Alleghany, he derived his knowledge from Herbaria; and many more, which grow beyond the Mississippi, he examined only in gardens or in the collections of Lewis and Bradbury, without ever seeing them in their native soil. Hence in these cases Pursh has repeatedly mistaken the genus of a plant, besides admitting many lesser inaccuracies into the specific descriptions. In respect to his arrangement it is to be remarked that he has made a very bold, although as to the conception of it not an original, innovation upon the classification of the sexual system. This innovation consists in the entire omission of Dodecandria and Polyadelphia, and the consolidation of Monœcia, Diœcia and Polygamia into a single class, according to the suggestions of sir James Edward Smith, in his Introduction to Botany. Dodecandria is an incumbrance on the sexual system, because it has no permanent invariable marks by which to distinguish it from the two succeeding classes, into which most of its genera are therefore transferred by Pursh. Polyadelphia, also, a very small and useless class, he has incorporated with Polyandria. But the greatest change hazarded by Pursh is the rejection of the twenty-first, twenty-second and twenty-third classes of Linnæus. These classes, as originally established, containing many genera, like Carex, Typha, Holcus and Panax, which differed only in the situation of their stamens and pistils, whilst all the accessary parts of their flowers were exactly alike, some botanists proposed to simplify the system by abolishing these classes and removing their genera into others in which the combination or number of their stamens entitled them to be ranked. But as the classes in question also contained many genera, like Pinus and Castanea, whose fertile were decidedly unlike their barren flowers, more judicious reformers have preferred retaining such genera in a distinct class, composed of three very natural orders, Segregatæ, including the tricoccus and some other plants, Amentaceæ, and Coniferæ, to which class they have given the name of Diclinia. This modification of the Linnæan arrangement simplifies it exceedingly, at the same time that it confirms the general principles of the sexual system. Whether it will ever obtain the public approbation or not, it certainly comes to us recommended by persons deserving the greatest deference, and is intimately associated with our botany in consequence of its adoption by Pursh. On the whole, this work, with all its imperfections, is more extensive in its nature, more accurate in its details aud more systematic in its whole plan and execution, than any thing, which had gone before it on the same subject; and if Pursh had lived to correct and complete the Flora according to his original design, it would have been surpassed by very few of the botanical collections, which the perfection of modern philosophy has given to the world.

During the latter part of the time Pursh was employed in collecting the materials for his Flora, Mr Nuttall also, another botanist, of whom we spoke as indebted to Dr Barton, was engaged in exploring the botany of several parts of the country, especially those in the upper part of the valley of the Mississippi. Before considering his discoveries, however, the order of time requires us to advert to Mr Elliott's Sketch of the Botany of South Carolina and Georgia,—a work, which, as promising an account of so interesting a division of the country from the hands of the most accomplished botanist in the South, it is much to be regretted that the author's private occupations or civil rank have prevented him from bringing to a conclusion. Only five numbers of it have yet been published, all which appeared in 1817, reaching to the middle of the class Decandria. It gives the essential characters, both in Latin and English, of the genera and species, including several that had not been described in any botanical publication before, all done with the greatest exactness and fidelity; but it is more valuable for exhibiting copious descriptions in English of most of the plants, with which the author was acquainted, within the limits of his plan, and for relating the useful properties of them, in which latter part of his undertaking Mr Elliott gratefully acknowledges the assistance he received from the late Dr Macbride. In most respects it merits to be considered a model among those Floras, which, being confined to a definite portion of the country, are less assuming in their tone than those which embrace a wider range, but perhaps more useful, because the author of a particular Flora, in concentrating his attention upon a certain number of plants, is rendered capable of giving these plants a thorough investigation.

Indispensably necessary to the student of our botany as a supplement to Pursh's Flora is Nuttall's valuable work on the Genera of North American Plants, published in the year 1818. After the remarks we have made on the classes as arranged by Pursh, we need say little concerning that part of the plan pursued by Nuttall, who retains the Linnæan classes

Monœcia and Diœcia, but judiciously imitates Pursh in omitting Dodecandria, Polyadelphia and Polygamia. This work abounds with extensive remarks, the result of long personal observation in different sections of the Union, especially in the Southern and Western States, in which last the author had a most ample field of research and discovery. His principal design was to describe the genera of our plants and merely enumerate the species. But he does much more than he promises, not only introducing a large number of new species detected by himself, but continually enriching his list of the old species with instructive remarks on their habit or character, and often going so far as to give us a full account of all the species of a genus. Among the genera so treated we may notice Viola, Rhexia, Œnothera, Laurus, Lobelia, Polygala, Carduus, Erigeron, Inula, Aster, and Solidago, as particularly rich in interesting botanical suggestions, from which we have repeatedly derived great advantage. But the author has been most elaborate and masterly in his delineation of the essential characters of the genera, which it is the primary object of his work to elucidate. He has proposed above sixty new genera, in several cases constructed by means of plants before imperfectly known, but chiefly by the subdivision of old genera. And we think that here lies the greatest defect of the work, namely, in a disposition to innovate upon the established genera, not always on the safest grounds. Thus in making a new genus Comandra of Thesium umbellatum and a genus Epifagus of Orobanche Virginiana, in separating the genus Juglans into Juglans and Carya, in adopting Desfontaines' dismemberment of the genus Convallaria into Convallaria, Smilacina and Polygonatum, in confirming Michaux and Pursh's division of the genus Pyrola into Pyrola and Chimaphila, in these, and in other instances, that could be pointed out, Nuttall appears to us to have ventured upon or assented to changes, which the generic differences he has indicated do not warrant, and which materially injure the science of botany by embarrassing its nomenclature and impairing the symmetry of its arrangements. Another defect in this work, and in a book of science it is no slight one, is the singular want of accuracy and finish in its literary execution. Thus, to give a specimen of the very many uncorrected typographical mistakes in it, the numbers of the genera from 412 to 734 are wholly erroneous, each number requiring an increase of a hundred to make it correct. Thus also the genus Hemianthus is inserted, where it would never occur to any one to think of looking for it, in the class Didynamia, instead of being deferred to the appendix. But these defects are atoned for, by the many useful improvements on our botany dispersed through the work, the most important of which is a careful investigation of the habit, natural affinities and geographical distribution of the genera. Especially in stating the mode of vegetation of a generic groupe, in imitation of Jussieu, our author has done a very essential service to the science and rendered the study of our plants much more interesting than it ever can be when pursued exclusively in dry technical forms invented by Linnæus. Indeed nothing more clearly demonstrates the unsatisfactory nature of the sexual system than the indirect attempts frequently made by recent botanists to engraft the natural affinities of plants upon their prevailing artificial characteristics. All that the sexual system can pretend to is a superiority over others, excepting perhaps that of Rivinus, for the purposes of a pinax or botanical index : how much it surpasses the system of affinities in this respect will appear evident, to give a familiar example, to a person who has ever made use of a dictionary, like Scapula's Lexicon, in which the words are arranged according to their roots, instead of the letters of the alphabet. If a system could be devised uniting the conveniences of the system of Linnæus and the natural propriety of Jussieu's, it would undoubtedly be the most desirable improvement of which the science of botany is now susceptible. For this reason we consider Nuttall's abridged view of the natural affinities of each genus one of the greatest advantages, which his book possesses, in comparison with any similar compilation.

Soon after the publication of Nuttall's Genera appeared Eaton's Manual of Botany for the Northern and Middle States, which, a limited edition of it having been printed before, was now reprinted with considerable improvements. The design of the work, as its title announces, is to serve as an index only to the vegetable productions of a definite portion of the Union, in imitation of Persoon's Enchiridium Botanicum, from which its name and much of its substance are copied. In one respect, however, its plan differs materially from Persoon's, and in a way that greatly enhances its relative utility as a pocket-companion for the botanist. We refer to the circumstance of its being divided into two parts, in the first of which are the characters of the genera alone, systematically arranged, in the second the names of the genera followed by the specific descriptions at length. The work, moreover, is wholly popular in its arrangements, design, and nomenclature, embracing not only indigenous vegetables, but even all those exotics which are cultivated in the interior parts of the country. Taking Persoon as the basis of his descriptions of phænogamous plants, both in the genera and species, the author has corrected and enlarged them, either from personal examination, or by reference to Pursh,—adding also twenty or thirty new species chiefly communicated by Dr Bigelow and Dr Torrey. We discern a defect of judgment in the execution of the literary parts of the Manual, of the same nature with that which we hinted at in speaking of Nuttall's Genera,—a defect in the distribution of notes and advertisements, in the structure of the language where the author writes in his own person, not as a botanist; and it is rarely that we see a dedication in worse taste than that which is prefixed to the Manual. It is impossible not to be struck with the inferior purity displayed in the composition of Nuttall and Eaton, when compared with that of Pursh, to whom the English language was not vernacular. As a convenient and accurate guide in botanical inquiries, however, compressing a great variety of matter into a narrow compass, the Manual is deserving of great praise. And it should be mentioned, as an additional recommendation of it, that, whilst Pursh and Nuttall have omitted all cryptogamous plants excepting the ferns, Eaton, on the contrary, has given quite a full account of the cryptogamous species, which he and his friends had observed, amounting to four hundred and twenty more than Michaux describes in the Flora Boreali-Americana.

It only remains for us to speak of two contemporary botanists, whose writings have recently occupied much of the public attention, namely, Dr William P. C. Barton and Dr Bigelow. Dr Barton, a nephew of the eminent philosopher of the same name, has published books on the subject of our botany of greater pretension than almost any other living author. Beside some tracts connected with medical science, in 1815 he printed a Prodromus of his intended Flora Philadelphica; in 1817 he began the publication of his Vegetable Materia Medica of the United States, previous to the completion of which in 1819, he gave the public, in 1818, his Compendium Floræ Philadelphicæ; and he is now issuing an expensive

Flora of North America. The Compendium, containing only brief descriptions of plants, with occasional popular observations, as it is the most unassuming, so we think it the most meritorious, among the botanical works of Dr Barton. It is the more valuable for being largely indebted to Nuttall's Genera. Barton's Vegetable Materia Medica gives an account of forty-eight plants with colored figures, including first the botanical characters of the genus and species adopted from the best authors, with a note of synonymes and copious references to writers who treat of the plant, next a general botanical history of it executed in a cursory manner, and lastly its chemical analysis, medicinal properties, and economical uses. The work manifests considerable industry in the compilation of facts and statements from various books; but the misfortune is, that, in the parts relating to medicine, it is almost entirely a compilation. Dr Barton appears rarely to have performed any experiments upon the chemical organization of the plants he describes, and seldom to have ascertained their reputed effects on the human system by personal investigation: so that in his remarks on the medicinal properties of plants he more frequently allows us to perceive what he does not, than what he does, know. The figures were drawn and partly colored by the author, many of them very correctly and elegantly, but many others so badly as to indicate great haste both in the coloring and the designs. Dr Barton has long proposed, as we have already hinted, to publish a complete Flora Philadelphica, from which the more early numbers of the Vegetable Materia Medica contain several extracts in the form of a Latin *descriptio uberior* of each plant; but we rejoice, for the honor of American literature, that this work has not appeared; for never, in the whole course of our reading, do we remember to have met with any thing which denoted such lamentable ignorance of the most common rules of grammatical inflection and concord, as almost every line in these descriptions exhibits.* Indeed, a looseness, a want of exactness and fidelity, prevails in all the botanical writings of Dr Barton we have seen, which we sincerely hope he will take care to avoid in the important work he is now engaged in executing on the Plants of the United States.

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* We have made use of such strong terms on this subject that we will subjoin a few of Dr Barton's numberless errors, merely to prove that we have not spoken without due consideration. Vegetable Mat. Med. v. i, p. 82, *des. uber.* for *succo fulvo exudans* read *succum fulvum ;* for *petala . . . perquam varians* read *variantia.*—Ibid. p. 60, for *baccæ . . . semina tria complectens* read *complectentes.*—Ibid. p. 66, for *foliola . . . subæquales* read *sub-æqualia.*—Ibid. p. 79, for *arbor . . . rariter ultra* 30 *pedales* read 30-*pedalis.* This error is frequently repeated, the adjective *pedalis* and its

Of Dr Bigelow's Florula Bostoniensis, although published in the year 1814, we have intentionally deferred speaking until now, because we wish to consider it in conjunction with the work at the head of this article on American Medical Botany. On looking back upon the sketch we have given, it will be seen that the Southern and Middle States have not only been more frequented by foreigners in quest of plants, but have also produced more native botanists, than New England. To the names of Bartram, Clayton, Colden and Kuhn we have none to oppose; the earliest on the list of our botanists is Dr Cutler; and if we pass over Williams, the historian of Vermont, the next are our own contemporaries, Prof. Peck, Dr Bigelow and Mr Eaton. If there had been any reason to reproach us with the neglect of the study of botany, we know not better how to show that this reproach has ceased to be well founded, than by pointing to the publications of Dr Bigelow. His edition of Smith's Introduction to Botany prepared the public to receive with favor the Florula Bostoniensis, which came out a few months after the Introduction; and both together were

compounds being always mistaken for substantives—Ibidem, for *flores magnes . . . maximi odori* read *magni* (not *magnæ*, as judiciously corrected by the author in his errata) . . . *odoris.*—Ibidem, p. 125, *a root consisting of radicles* is latinized into *radix sistens radicularum*, and by the same kind of rendering we have *antheræ duarum loculorum sistens*, which is a perfect miracle of bad grammar.—Ibidem, for *segmentibus* read *segminibus.*—Ibid. p. 173, for *fructus ex calyce facta . . . coccinea, esculenta*, &c. read *factus, coccineus* &c.—Ibid. p. 205, for *nervibus* read *nervis.*—Ibid. p. 222, for *Ament. mas. laterales, erecti*, &c. read *lateralia* &c.—But the *ne plus ultra* of bad Latin is the description of Liriodendron tulipifera, p. 93, where, among other phrases no less extraordinary, occur the following; *Arbor nonnunquam altitudine* 100 *pedales, et in circulo* 30.—*folia . . . in lobis . . . dissecta.*—*flores numerossissimæ, magnæ, formosæ, sed odori omnino destitutæ*—*calyx . . . sistens involucri proprii*—*staminæ numerosæ, longæ, filamentis linearis, corolla brevibus* (for *stamina, numerosa, longa, linearibus* and *brevioribus*) —*pistilla . . . quasi strobili dispositis*—*stigma globosa*—*seminis numerosis in squama . . . terminatis et omnis in conum imbricatis.* This is nothing but a spicilegium, a sort of choice of evils, culled from the many other barbarisms and solecisms of the same stamp in this work. In the second volume, however, Dr Barton very considerately abstains from venturing upon the *descriptio uberior*, excepting in one or two instances, in which he acquits himself no better than before, as on p. 223, vol. ii, where we have *pedunculi pubescenti uniflori* instead of *pedunculi pubescentes uniflores.*

precisely of that popular description, which was best adapted to introduce botanical studies into the eastern metropolis. The Florula Bostoniensis, containing accurate translations of the specific and generic characters which are given us by the most reputable botanists, together with an extended account of the plants taken from living specimens, and indications of their localities, time of flowering and duration, was admirably calculated to overcome the repugnance, which could not but have existed at the time it appeared, against the general study of a science (as to us) for the most part locked up in the rare works and semi-barbarous dialect of Linnæus, Gronovius, Walter, Michaux and Willdenow. And, although the Florula is less complete than might be desired, we can say, after much use of it, that we know of no botanical book defaced by fewer errors:—which errors will undoubtedly be corrected, at the same time that the deficiencies of the work are supplied, in the new edition of it, which the public has long demanded. If any thing in the *plan* of the Florula is defective, it seems to us to be the omission of the common exotics, such as maize, wheat, roses, lilacs, cherries, and the rest of those cultivated exotics, which, either as ornamental or useful vegetables, occur to the young botanist as frequently as any of our indigenous plants, and of course equally tend to excite his curiosity. The insertion of these, whether in the body of the work or in an appendix, would certainly much enhance its usefulness. Among his other scientific labors, Dr Bigelow has since published several tracts connected with botany, to which we merely allude, that we may come the sooner to his American Medical Botany. The contents of this work are a detailed account of sixty of those indigenous or naturalized plants, which are best capable of application to medical use, or seem otherwise remarkable on account of their ascertained or reputed effects upon the human body. It not having been our intention to enter into an examination of any thing more than the botanical part of the work, we shall only observe, as to the rest, that neither Schœpf nor the Bartons materially increased the sum of our information concerning the chemical or medicinal properties of the vegetables of the United States. Schœpf pretends to do nothing more than record, with the most implicit credulity, whatever, to translate his own words, he could learn 'from physicians, empirics, peasants and old women;' the natural consequence of which is, that his book is full of stale drugs of exploded virtue, almost every one of which he represents as a panacea. The Bartons present us with very few, and those but partial investigations of the chemical constitution of plants, and still fewer satisfactory proofs of their practical utility. Dr Bigelow, on the contrary, has made careful experiments on the analytical structure of the plants, which he selected for examination: many vegetables of supposed efficacy he has proved to be feeble and inert; others, before of doubtful utility, he has established among the happiest agents in the materia medica; and none has he left without making some perceptible addition to the stock of science. Passing from these considerations, we find that he has not only described the botanical properties of his plants with great accuracy, which is more than can be said of his predecessors, but has also done it with perspicuity and elegance of expression. Every article abounds with important botanical observations; often, too, the character of a plant leads to instructive remarks connected with it, like those upon generic distinctions in Gillenia trifoliata, upon the communication of plants between Europe and America in Ranunculus bulbosus, upon the scenery of our forests in Rhododendron maximum,—all of which are the more grateful for being unostentatiously introduced. Eight of the plants in the Medical Botany are also described and figured in the younger Michaux, namely, Laurus Sassafras, Magnolia glauca, Cornus florida, Juglans cinerea, Kalmia latifolia, Liriodendron tulipifera, Rhododendron maximum and Juniperus Virginiana; but a comparison of the respective articles in each book will render it obvious that Dr Bigelow is not a copyist; for, in these very articles, the Medical Botany abounds with interesting facts, which it did not enter into the design of Michaux to notice, if they ever came to his knowledge. The same comparison, we think, will end in a conviction of the greater accuracy of the figures in the Medical Botany, inferior as they certainly are to those of Michaux in brilliancy of coloring, and in that graceful, lively, finished representation of verdant nature, which evinces the perfection of modern art in Europe. Thus, if we compare the Liriodendron tulipifera in each, we perceive a more vivid green in the print of Michaux than we do in that of Bigelow: but the latter is drawn from the best chosen specimen of the two; and the flower in Michaux is spread open so far as to conceal the calyx and give an artificial appearance to the petals and stamens, both which defects are avoided in the plant, as delineated in the Medical Botany. Bigelow's work comprises most of the plants figured in Barton's Materia Medica, and also many beside; and although the prints of the latter derive a superior freshness from the circumstance that their colors were put on by the hand, whilst the former came colored from the plates, still the greater finish and fidelity of the figures in the Medical Botany entitle them to higher regard than those of the Vegetable Materia Medica. Whether we regard Dr Bigelow's work as a specimen of art, or as a scientific exposition of facts, we think it may be safely put into the hands of foreigners, together with Cleaveland's Mineralogy, in proof that we no longer mean to learn from them how to prize the riches contained in our forests and on our mountains. It gives us full reason to regret that the work, which he and Mr F. Boott had announced their intention to publish on the plants of New England, is likely to be delayed in consequence of the absence of the last gentleman from America.

We have now brought down the literary history of our botany to the present day. Of the Hortus Kewensis, the Botanical Magazine, Lamarck's portion of the Encyclopédie Méthodique, and similar extensive collections of plants, we need say nothing, because they are the common property of the botanical world. We will only observe, that, in his more recent communications to Rees' Cyclopædia, sir James Edward Smith seems to have paid very marked attention to our botany, and to discover a proper respect for our botanists, as may be gathered from the manner in which he alludes to Mr Nuttall and Dr Bigelow in several passages; from what he says of Mr F. Boott in the articles Viola pubescens and Utricularia cornuta, and of Dr Muhlenberg in describing the grass dedicated to that eminent naturalist by Schreber. We have omitted to make any particular mention of Forster's Catalogue of the Plants of North America,* Hosack's Hortus Elginensis, Rich's Synopsis of the Genera of North American Plants, Torrey's Catalogue of the Plants of New York,†

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* This Catalogue we have seen in several forms; but it most commonly occurs in the appendix to Forster's translation of Bossu's Travels in Louisiana.

† We cannot refrain from forsaking our plan so far as to express our respect for Dr Torrey, whose name we have more than once had occasion to introduce into this article, as a zealous and successful botanist. The Catalogue referred to in the text, prepared for the Lyceum by Dr Torrey, Dr

Peck's Catalogue of the Plants in the Botanic Garden at Cambridge, and some other books of the same description; as likewise of the elementary works of Eaton, Eberle, Lock, and Sumner: because these, although for the most part useful and convenient, as applied to their intended purpose of facilitating the study of our botany, cannot, of course, be supposed to have made any material additions to the stock of botanical science in the United States. Nor were the preceding notices, as we intimated in the beginning with regard to the work at the head of this article, written with a view that any of the books mentioned should be considered in the light of novelties, since the public opinion has fully appreciated their individual merits long before this time; and indeed it is more especially from the public opinion that we have always been happy, where we could, to confirm our own sentiments. But we felt desirous to bring together into one view the printed botanical resources of our country; and having done this, we now proceed to inquire into the completeness of these resources.

In order to ascertain the number of plants hitherto described by botanists as growing spontaneously in the United States, we have been at some pains in counting the latest catalogue of them, which is contained in Nuttall's Genera. We found this catalogue to comprise thirty-two hundred and thirty phænogamous species. If to these we add the plants detected by Mr Boott on the White Hills, and the species communicated to Mr Eaton for his Manual by Dr Torrey, together with the few other species since found by Mr Le Conte, Mr Eddy, Mr Ives, Mr Rafinesque, and other botanists, we apprehend the number of our plants, as yet described, will hardly be made to exceed thirty-three hundred, exclusive of the cryptogamous species. Even this number, limited as it is, has but recently been known to grow in our country. In 1803, when Michaux published his father's Flora, not half so many had been discovered; and since 1814 the number has received an accession of four hundred vegetables, for Pursh's Flora contains but twenty-eight hundred and ninety-one phænogamous species, as we learn from Humboldt's Prolegomena on the Geographical Distribution of Plants. The figures 4, 8 and 9 respectively will very nearly express the relative number of

Eddy, and Dr Knevels, is drawn up with great skill, and with a fulness much above the ordinary scope of botanical catalogues. We therefore await, with great expectation, Dr Torrey's promised Flora of New York.

phænogamous species enumerated by Michaux, Pursh, and Nuttall. Now if we consider that Europe, embracing perhaps a less extent of territory than the United States, and certainly not affording greater diversities of climate, is known to contain at least seven thousand phænogamous species of plants proper to itself,* we cannot avoid being led to the conclusion that the enumeration of our plants is still exceedingly incomplete.

Nor could we justly anticipate any thing else from an examination of the facts. So long as the greater part of our continent remains an untrodden wilderness, and the rest is but just recovering from the state in which it left the hands of nature, it is useless to think of writing or publishing a perfect North American Flora. Men of science are as yet only scattered here and there by the sea-coast and on the banks of our great rivers: they have neither opportunity nor leisure to explore their immediate neighborhood; much less have they been able to traverse the vast extent of our western and northern hemisphere. They have made little excursions into the borders of their residence, but they have not discovered a thousandth part of the natural riches, which abound in careless profusion throughout the country, and which must waste their sweetness in the desert for generations yet to come. We shall be confirmed in this opinion of the great incompleteness of all existing collections, if we advert to the localities indicated in those collections. We find they say little of Florida, little of the regions bordering on the Lakes, little even of some of the

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* In 1817, it was calculated that there had been described or preserved in herbals 44000 plants, of which 6000 were cryptogamous, and 38000 phænogamous species. Of the latter the following was supposed to be the distribution, namely :

Europe - - - - - - - - - - -	7000
The temperate regions of Asia - - - - - -	1500
The tropical regions of Asia and the adjacent islands	4500
Africa - - - - - - - - - - -	3000
The temperate regions of America in both hemispheres	4000
The tropical regions of America - - - - -	13000
New Holland and the islands of the Pacific ocean - -	5000
	38000

See Humboldt, de Distributione geographica Plantarum secundum Cœli Temperiem et Altitudinem Montium Prolegomena, p. 23. Decandolle thinks, if all the plants on the globe were known, they would be found to exceed a hundred thousand species. Théorie élementaire de la Botanique, ed. 2de, p. 25.

maritime States, as Maine and New Hampshire. And how much do we know of the rich and verdant tract spread out in the immense valley of the Mississippi and his tributary waters, of the boundless savannas in the West, of the widely-extended regions beyond, that are washed by the Pacific Ocean? All these comprehensive sections of our territory, for some of which the world can show no parallel for mildness of climate, extent of irrigation, and inexhaustible fertility of soil, are as yet but superficially known to the botanist.

How rich the tracts of country west of the Mississippi are in undescribed plants may be satisfactorily seen, from a circumstance attending the expedition of Lewis and Clarke across the continent of North America. In the course of the slow ascent of the expedition towards the head-waters of the Missouri, an extensive collection of plants was made, which, being desposited at the foot of the Rocky Mountains, was unfortunately never recovered. During the rapid return of the expedition, after recrossing the mountains, a second, but smaller, collection was made by Mr Lewis, consisting of about one hundred and fifty specimens, among which were not above a dozen plants before ascertained to be natives of this continent, the rest being altogether new or but little known, and containing six or seven distinct undescribed genera. Many of them also were highly remarkable, not only as new plants, but as possessed of useful or curious properties. Such were the Psoralea esculenta, whose root is an ordinary article of food among the savages; the Mahonia Aquifolium, bearing esculent berries; the Maclura aurantiaca, whose ornamental foliage and fruit and heavy solid wood render it of great value; the Bartonia ornata, with its brilliant odorous flowers resembling the larger Cacti and making it worthy of the distinguished antiquary and naturalist whom its name is intended to commemorate. The fact, therefore, that so large a proportion of the plants brought back by Lewis and Clarke were new to botanists, fully proved the botanical richness of a region, where indeed Mr Nuttall and Mr Bradbury have since made so many interesting discoveries, and which still remains open to reward the zeal of future naturalists.

Nor do we believe that any considerable portion of the regions on this side of the Alleghany has been thoroughly investigated. Let us examine the botanical catalogues, that have been made, of the neighborhood of our larger maritime cities,—spots, which, from the narrowness of their extent, and from the multitude of botanists by whom they are likely to be inspected, we may suppose to have undergone a more perfect scrutiny than any of the wild recesses in the West. Do we find that either of these collections has exhausted the botany even of the confined district which its plan comprehends? So far is this from being the fact, that every day is exposing the deficiencies of our most valuable Floras. Our readers will not doubt, from what we have said in another part of this article, that we entertain a high opinion of the Florula Bostoniensis. This work embraces a narrow circuit of less than two hundred square miles in area, its localities seldom departing from Milton, Dorchester, Roxbury, Brookline, Brighton, Watertown, Cambridge, Medford, Charlestown and Chelsea, all included in the half of a small circle of which Boston is the centre, as may be perceived by casting the eye upon Hales' Map; and we have good reason to believe that, open to examination as this tract is in all its parts, the five hundred species described in the Florula do not exceed three quarters of the species growing spontaneously in the vicinity of Boston. Now if we recollect that the vicinity of Boston exhibits no extraordinary varieties of soil or structure, that it is shaded by few and those insignificant forests, that it presents hardly one of those rich watered glens, which, in many parts of New England, are perpetually verdant with a diversified succession of luxuriant vegetables, that it is not large enough to contain those mountainous ridges which enjoy such a peculiar vegetation,—if we recollect all these circumstances, and at the same consider how many plants in this district were overlooked by the practised eye of so discerning a botanist as Dr Bigelow, what shall we say of all those other more extensive districts in the Atlantic States, in which the foot of a botanist treads only by chance and at protracted intervals?

We do not mean to infer from this, that every space of two hundred miles in extent from Maine to Georgia would afford a century or two of species omitted in all existing collections of our plants, because the vegetation of most of the Middle and Eastern States is so uniform, that a botanist, who has examined all the plants growing near Albany or New York, for example, has probably seen most, but certainly not all, of those which could be found about Boston, and the reverse; and thus a naturalist, who elucidates the botany of any considerable portion of a single State, as Connecticut, does much towards elucidating that of the whole of New England. But surely we shall be justified in concluding from it, that the botany even of the best inhabited parts of the country is still but imperfectly known. And only adverting to the single fact, that the Florula Bostoniensis contains two new species, and supposing that in the average every hundred miles in the two and a half millions comprehended by the United States is capable of furnishing a non-descript species,—in which supposition we really can see nothing unreasonable,—and we shall still have an immense field of investigation remaining for botanists in the United States.

Beside these general views of the subject there are distinct considerations belonging to some of the natural orders and also to certain groupes of plants apart from the natural orders, of which we will only mention a few examples. From the exact calculations of a botanist, whom the Baron de Humboldt employed for that service,* it appears that the Gramineæ alone form a tenth part of our phænogamous vegetables, and the Gramineæ with the two proximate families of Cyperoideæ and Junceæ one eighth part of the same; and although, as we have remarked before, these families were till recently much neglected among us, yet Muhlenberg's Description of the Grasses in a great measure atones for and remedies this neglect; but the numerous Gramineæ and Cyperoideæ are so intricate in their characters, that we can hardly suppose they are even now so fully elucidated as the more attractive and ostentatious families. Another extensive order is formed of the Compositæ, which amount to one sixth part of our phænogamous plants, and at some seasons of the year almost cover our fields with their luxuriant flowers. Next to the Gramineæ, this family is perhaps the most difficult in its lower subdivisions, in a few of the generic differences and in very many of the specific. The kindred genera of Erigeron, Inula, Aster and Solidago contain each so many species, and these so much alike in their exterior qualities, that modern botanists have been obliged not only to draw out their specific characters to a most burdensome length, but likewise in several cases to resort to the microscope for the detection of well-founded differences for the species. Not to extend these details too far, we will only refer to one more natural assemblage of phænogamous plants, the Amentaceæ and Coniferæ, which include a large proportion of our forest-trees. Of all our vegetable productions these are unquestionably the pride and glory; for none of the forests in other temperate regions of the globe rival ours in variety, magnitude, or splendor. No part of Europe, for instance, in latitudes of corresponding temperature, can exhibit trees of so rich a foliage and inflorescence as the Magnolias, or of such stateliness as the Pinus strobus, sometimes rising to the height of upwards of two hundred feet, with a straight and graceful trunk more than twenty feet in circumference at the base, the Liriodendron tulipifera with a trunk still more beautiful than the pines, the Pavia lutea, Pavia Ohioensis or Rhododendron maximum. Again, the younger Michaux mentions, as a striking fact, that he had observed in the United States a hundred and thirty seven trees, which rise above the height of thirty feet, whereof ninety-five are employed in the arts; but that France, on the contrary, which might be considered a pretty fair representation of the same range of temperature, produced no more than thirty-seven trees of equal height, including but eighteen forest-trees, and that of these only *seven* were employed in civil or marine architecture. Without stopping to draw the political inferences, which this comparison would suggest, we will merely say that Michaux, in his History of our Forest Trees was so far from exhausting the subject, that he did not even pretend to have crossed the Mississippi, that he confessedly left the history of the trees even on this side the mountains incomplete, and that several very important additions have already been made to the forest-trees which he was able to enumerate.

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* The natural orders of our phænogamous plants are stated by Humboldt to be as follows, namely: Cyperoideæ one 40th, Gramineæ one 10th, Junceæ one 152d, Labiatæ one 40th, Rhinantheæ and Scrophulariæ one 36th, Ericeæ and Rhododendra one 36th, Compositæ one 6th, Umbelliferæ one 57th, Cruciferæ one 62d, Malvaceæ one 125th, Caryophylleæ one 72d, Leguminosæ one 19th, Amentaceæ one 25th, and Coniferæ one 105th, supposing the whole number taken for the integer to be 2891 as collected in Pursh's Flora.

All that precedes will apply only to the phænogamous species: for we shall find our agamous plants to have been generally neglected by naturalists. Clayton sent Gronovius an account of only ninety-five species of this extensive class, Michaux falls short of the same number, and, as we have already observed, no part of them excepting the ferns engaged the attention of Pursh or Nuttall. Yet so multitudinous are the plants of this family, that Muhlenberg, in his Catalogue, makes mention of more than eight hundred species, and about one seventh of all the genera there enumerated are of the class Cryptogamia. And what sets the deficiency of our botanical publications on this head in a clearer light is the fact affirmed by Dr Schweiniz, that he himself had observed nearly one thousand six hundred species of the single order of Fungi in the western part of North Carolina. Eaton gives us very complete descriptions of a hundred cryptogamous genera and a cursory account of four hundred and seventy-six species; which is very much more than any preceding botanist has done: but Eaton and Nuttall both refer us on this head to Muhlenberg's long-promised Flora Lancastriensis. How far the labors of Dr Muhlenberg and Mr Collins, who are understood to have been particularly sedulous concerning the cryptogamous families, might go towards supplying the deficient information on this subject, we cannot tell. These plants, however, which it almost baffled the ingenuity of Linnæus himself to arrange, abundant as they are in this country, can at present be studied with no better assistance than a few restricted publications afford, so that upon no class of our vegetable productions is it more desirable that experienced botanists should bestow their industry. But our knowledge of this class will not long remain so imperfect, if Dr Schweiniz meets with encouragement to publish his intended Description of the Cryptogamous Plants of North America; of which he has recently printed a specimen, containing the hepatic mosses, executed after the manner of Pursh's Flora.

In addition to these and other general or particular defects in the botanical collections relating to the United States, another very important object of inquiry is the difference and affinity between our plants and those of Europe. No doubt there are many vegetables, which were always common to the two continents, such as Epilobium alpinum, Azalea Lappouica, Diapensia Lapponica, Carex curta, Betula nana, Linnæa borealis, Draba nivalis, Lobelia Dortmanna, Humulus Lupulus, Anemone nemorosa, several of the Veronicæ, Arenariæ and Ranunculi; and many likewise which are known to have emigrated with the colonists, Leontodon Taraxacum, for instance, Sonchus oleraceus, Arctium Lappa, Conium maculatum, Hyoscyamus niger, Chelidonium majus, Symphytum officinale, Triticum repens, Raphanus Raphanistrum, Cnicus arvensis, Malva rotundifolia, Ornithogalum umbellatum and Polygonum aviculare ;* and some which we have imparted to Europe, as Rumex sanguineus, Erigeron Canadense, Phytolacca decandra, several Ambroseæ and Amaranthi; but the number of plants *originally* common to the eastern and western continents is much smaller than has been generally imagined, if it be true, which has been affirmed on good authority, that Pursh's Flora contains only three hundred eighty-five plants properly European, that is, no more than $\frac{2}{15}$ of the phænogamous vegetables then ascertained to spring up spontaneously in the United States. Even this small number is continually diminishing; for although certain plants, beyond a question, are actually common to the two continents, especially some of the boreal and alpine plants, yet late botanists have made new species of many of the plants which were formerly accounted European. Thus the plants, which were long supposed to be Viola canina, Trientalis Europæa, Valisneria spiralis, Erythronium dens canis, Alisma Plantago, Cratægus oxyacantha, Sorbus aucuparia and Cypripedium Calceolus, and of course European, are considered as distinct by Pursh and others under the names of Viola debilis, Valisneria Americana, Erythronium Americanum, Alisma trivialis, Cratægus apiifolia, Sorbus microphylla and Cypripedium parviflorium. Nor is this all the difficulty. Not unfrequently an American plant occurs, which, in its exterior botanical aspect, is incapable of being distinguished from the European, but yet is known to be essentially different in its chemical or physiological properties. Dr Bigelow adduces two or three remarkable instances of this fact, in his interesting, and, so far as we could judge in examining much of the same scenery with his work in our hands, very complete and accurate Description of the White Mountains. A species of

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* Humboldt, in the work referred to above, seems to think that Polygonum aviculare was always common; but Josselyn, in his Rarities of New England, recounts it among the emigrants. It may be mentioned here, that the remarks in the text are confined to Europe. Pallas's Herbarium and Flora Rossica evince that the plants of North Asia have great affinity with our own; and the eastern shores of Asia between the parallels of thirty and forty five are said to contain many plants also found on the eastern shore of North America. Asiatic Tartary appears generally to resemble the primitive state of North America in climate, vegetable productions, aboriginal inhabitants and dialects so much more than any other region of the world, that a judicious investigation of the subject is a great desideratum in our historical antiquities.

Æthusa growing about Boston, although botanically the same with Æthusa cynapium, is altogether destitute of the nauseous alliaceous taste by which that plant is noted in Europe. Another instance, adduced in Bigelow's Medical Botany, is of Asarum Canadense, which, although widely different in effect upon the human body, the elder Michaux says can with difficulty be distinguished from a European species of Asarum. A still more striking case is that of the chestnut-tree. Michaux the son thought the American chestnut distinct from the Castanea vesca, relying for his distinctions chiefly on the size and shape of the fruit; but Pursh and Nuttall deny that there is any thing in our chestnut sufficiently marked to become the ground of a specific description. Yet the wood of our chestnut is porous, weak and brittle, while in Europe that tree is in the highest estimation for compactness, tenacity and strength. In Italy the chestnut is employed in making staves for wine and brandy-casks, but the staves fabricated from it here have not been found close-grained enough for the same purpose. Throughout France and the rest of South Europe, the hoops of casks and vats of all dimensions are generally made of young chestnut, which experience testifies to be as flexible, tough and elastic as the occasion requires, and moreover peculiarly eligible on account of its durability: whereas coopers in this country uniformly assured Michaux that our chestnut was too brittle to be used in hooping. In both continents, however, the chestnut is equally valued for its capacity of withstanding exposure to the vicissitudes of heat and cold, of moisture and dryness, for which reason it is preferred in several of the Middle States in the construction of rails and posts for enclosures.* These examples, which might be multiplied, will suffice to show the nature of the fact, and to manifest the necessity there is for a careful examination of the differences between allied plants in Europe and America.

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* The trunk of the chestnut in Europe exceeds that of all other trees in thickness. One of these vegetable monsters growing on the sides of mount Ætna is asserted by Michaux to be a hundred and sixty feet in circumference, or fifty three feet in diameter, entirely hollow and subsisting only by means of the bark and a few adjacent layers of wood. Near this chestnut are several others, seventy-five feet in circumference. Not far from Sancerre in France is a chestnut thirty feet in circumference, with a perfectly sound trunk, which is supposed to be a thousand years old, and which for six hundred years has gone by the name of *le Gros Châtaigner*. No chestnuts of such enormous size have yet been noticed in the United States; but the chestnuts, which grow on the mountains of North Carolina, are as large as the generality of chesnuts in Europe. Michaux, Histoire des Arbres Forestiers de l'Amerique Septentrionale, tom. ii, p. 157.

That these and all other deficiences in our botanical collections will be made up by those who are most directly interested in seeing it accomplished, by native Americans, we certainly have at this time equal reason to hope and believe. The prevalence of the study of botany, either as a source of elegant recreation, or as a means of enlarging the boundaries of human knowledge and multiplying the comforts of human life, is much increased in our country since that period, when the few botanists, who belonged to it, looked to nothing higher than the ministering to the curiosity of two or three men of letters in Europe. And although we are not of opinion that botany has any peculiar tendency to instill exalted notions of moral obligation like ethics, or sharpen the acuteness of our intellectual powers like abstract reasoning, yet we think it authorized to assume a very respectable rank among the sciences of secondary importance : for, even encumbered as it now is with artificial forms, if the study of it be pursued, where alone it ought to be pursued, among the wild scenes of our meadows, rocks and forests, it cannot fail to improve the mind and heart by leading the imagination to dwell upon those noble exhibitions of the power of providence in exterior nature, the majesty of which is only surpassed by their beauty.

ART. VI.—*Symzonia, a Voyage of Discovery, by Captain Adam Seaborn.* New York, 1820. 12mo, pp. 248.

NOTHING furnishes a stronger illustration of the superficial taste of men, than the almost exclusive attention they have paid to the external surface of the globe. The same willingness to be blinded by the outside appearance, which obtains in the details of manners and character, has exerted a much more pernicious effect on the general regard men have bestowed upon the earth they inhabit. One is fatigued with the mass of travels to explore its unknown regions, of voyages to discover its distant seas. Not an arrogant mountain, that towers upward, but has been measured ; nor an indenture on the rind, by the name of an ocean, a mine, or a valley, but has been fathomed, descended, and traversed till one is weary of

NOTE TO CORRESPONDENTS.

Communications on the Course of Mathematics for the University at Cambridge; on Schoolcraft's Journal; on the Proceedings of the Legislature of Maryland relative to the appropriation of public lands for the purposes of education; and the 'Vindication of the laws limiting the rate of interest on loans, from the objections of Jeremy Bentham and the Edinburgh Reviewers,' have been necessarily omitted in this number of the North American Review.

ERRATA IN THIS NUMBER.

Page 136, line 8 from the bottom, for Messrs Murray, Draper & Co. read Messrs Murray, Fairman & Co.

Page 130, line 6 from the bottom, for *agamous* read *cryptogamous*.

ERRATA IN THE LAST NUMBER.

Page 402 line 11 for *unthinking* read *unshrinking*.
— 404 — 6 — *reverend* — *reverent*.
— 405 in the middle; for *remembrances* read *remembrancers*.